

Limitorque Actuator Inspection & Testing Procedure

Detailed below are the critical points of inspection for Limitorque Valve Actuators. Each item represents a feature which is critical to the safe operation of the actuator. The first part covers the online inspection. It may or may not be possible to cycle the operators online. The second part covers offline inspection.

Online Inspection

The items listed below are intended as a guide for the inspection of Limitorque valve actuators. Since an online unit cannot be disassembled and perhaps not even test-cycled, the inspection is very limited and will not result in a complete evaluation of the actuator condition.

1. Housing Group

For SMB or L120-190 through 2000 operators, this includes the housing, housing cover, and spring cartridge cap. For L120-10 through 85 units, an add-on thrust base is used to carry the valve thrust load. Clean the outside surface thoroughly prior to inspection. Inspect the load-bearing parts of the structure, as well as the fasteners, for any cracks, deformation, or other damage. Housing covers and spring cartridge caps which have been over stressed will often be bowed, with a gap showing at the interface between the two parts. Look for stretched or loosened bolts holding the housing cover, spring cartridge cap, or thrust base in place. Inspect bolt holes closely since cracks often start in bolt holes.

2. Wiring and Electrical Systems

Inspect the wiring inside the limit switch compartment as well as the motor leads. Look for frayed, cut, or burned insulation, pinched wires, undersized conductors, and improper end connectors. The wiring layout should be checked to see that it conforms to the schematic issued by the manufacturer and that no load controlling switches or safety systems have been bypassed.

3. Lubrication

Examine the condition of the lubricant in the gearbox. A small sample may be taken by removing one of the pipe plugs in the side of the housing. The grease should be soft and readily "slump" to fill in the areas around the gear mesh and cover the worm and worm gear. Hard, wax-like grease indicates poor maintenance of the operator.

Off-line Inspection and Testing

Disassembly of the actuator allows a thorough examination of the critical components. Cycling the actuator can provide valuable information on the condition of the unit. If possible, the unit should be run in both the open and close directions, both electrically and manually. Check the function of the declutch mechanism. Listen for unusual noises and check for vibrations. If an unusual, cyclical noise is detected, try to determine the frequency. Knowing the motor speed and gear ratio, it is often possible to locate the source of the noise.

Before disassembling the operator, make sure that the electrical power has been turned off. If at all possible, the valve which the actuator is mounted on should be decommissioned to relieve the possibility of any pressure acting on the valve stem. It is absolutely imperative that there be no mechanical load on the operator.

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4. Stem Nut (Rising Stem Valves)

The stem nut must be removed from the operator for proper inspection. On an SMB unit, the stem nut is located in the drive sleeve. Check the threaded locknut and the internal

threads in the drive sleeve for damage. An L120 unit employs a lug-driven nut mounted in an add-on thrust base. Inspect the acme threads in the bronze nut for wear, galling, and lack of lubrication.

5. Gear Drive Train (Motorized)

The motorized gear train includes the motor pinion, wormshaft gear, clutch, worm, and worm gear. Examine all gear teeth for signs of excessive loading. These signs include blued teeth (high heat) galling, roll-over at the crest of the tooth, bronze embedded in the worm threads, and heavy localized wear. On the bronze worm gear, look for teeth that are worn thin. The clutch should be examined for damage to the drive lugs on both sides.

6. Gear Train (Handwheel)

Pay particular attention to the condition of the handwheel drive train components, which are often subjected to manual overloading. Examine the handwheel for cracks or other damage. Look for any evidence that a valve wrench or cheater bar has been used on the handwheel rim or spokes. If the handwheel has been removed, look for wrench marks on the handwheel shaft or if the end user has installed a drive nut. On the shaft, look for damage to the key slots. Inspect the handwheel spur gear and spur pinion for galled, cracked, or bent teeth. The declutch fork and trippers should be checked for worn or gouged surfaces which would prevent proper operation of the declutch mechanism. Check the clutch fork rollers to be sure that they roll freely.

7. Torque Switch and Limit Switch

Examine these switches closely as they are critical to the safe function of the actuator. The torque switch is factory-set to prevent the actuator from stalling. Check the switch setting against the torque switch setting chart for this operator. Inspect the switch for any damage. Check the roll pins securing the link and pinion to the shaft to make sure they haven't been sheared. Make sure that the travel limit switches are adjusted to shut off the motor before the valve goes into a hard seat. Make sure that jumper wires are not being used to disable the switches.